Appendix D

Permit To Penetrate Ground or Existing Surfaces of LBNL Property, Administrative Procedure – Document Control, ADMN-053.

PERMIT TO PENETRATE GROUND OR EXISTING SURFACES OF LBNL PROPERTY

ADMINISTRATIVE PROCEDURE – DOCUMENT CONTROL

1.0 OBJECTIVE:

This procedure defines the steps necessary for the safe penetration of ground or existing surfaces of LBNL properties and covers those institutional requirements that must be completed prior to beginning any penetration action in any surfaces in LBNL. Of particular concern is the prevention of contact with live electrical conductors or other significant hazards (i.e., natural gas, water lines, compressed air lines, etc). The intent of this procedure is to minimize the chance of injury or death to personnel and to protect known or unknown buried utility lines. This will minimize disruption of essential services when penetrating or excavating the ground surface of LBNL property. The objectives of this procedure are to assist Laboratory Management with the accomplishment of the following:

A. Maintain employee health/safety.

B. Protect the environment and real property.

C. Ensure operational reliability of concealed utility systems.

D. Ensure that Penetration Permits are tracked, reviewed, approved, distributed, and revised as necessary according to standard Facilities Division document control procedures.

E. Improve communication with personnel involved in the permit process.

1.1 Application:

This procedure applies to all work that requires penetrations of existing surfaces of LBNL and LBNL leased buildings where the surface penetration work is managed, supervised and controlled by LBNL personnel. The LBNL Permit to Penetrate Ground or Existing Surfaces of LBNL Property (here known as Penetration Permit) is required for all penetration of any surfaces of depth greater than 1-1/2 inches at LBNL.

1.2 Scope:

1. The permit is required for all work performed at LBNL that involves penetration of any landscape ground surfaces, walls, columns, floors, and ceiling deeper than 1-1/2 inches.
2. The permit must list special conditions and potential hazards, and clearly identify equipment and underground utilities that will be affected.
3. The permit must be carefully reviewed by Facilities Division personnel, its distribution must be properly controlled, and the fulfillment of these conditions must be documented.

1.3 Special Instructions:

1. Equipment and training required:
   a. Electronic sensing device (Locator).
      Operator must be trained and must be certified as defined by the professional locator competency standards and performance criteria of the National Utility Locating Contractors Association (NULCA) and instrument manufacturer.
   b. Confined Space training and procedures.
   c. Understanding the use of barricades, sand, base rock, concrete, asphalt paving (blacktop), etc.
2. Any core drilling or saw-cut operations including ALS that remove concrete volumes greater than 4″ in diameter shall require the approval of the LBNL Design and Construction Department Structural Engineer.
3. Excavation within 30 inch radius of the marked utility must be excavated by hand using a flat tipped shovel, vacuum, or excavated with appropriate safe technology, such as an air knife until

the utility is located or the excavation has reached the required depth. High pressure water excavator is specifically prohibited due to the possibility of water leaking into high voltage underground electrical duct banks/conduits.

For gypsum board (sheet rock) wall surface penetration; a penetration less than the 1-1/2 inches in depth will be made with an acceptable area removed to expose the interior wall cavity for utility location(s) if necessary. As a result, an electronic survey may be conducted, but a penetration permit will not be required.

If the destructive process is to be used for excavation after underground utilities are located, approval must be obtained from the Project Manager to proceed. The Utilities Coordinator must shut-off and/or secure located utilities by Lockout/Tagout (LOTO) procedures if applicable.

4. Contract Document Requirements.

   The LBNL Master Specification includes the requirement that the Subcontractor obtains an approved Penetration Permit prior to any ground penetration, adhere to the conditions during work, and take financial responsibility for any damage to utilities or other resulting losses.

   PM shall ensure that the following sections of the specifications are in place, revise if necessary for specific project needs.

   a. Master Specification Section M01020, paragraph 1.19.A, Permit to Penetrate Ground or Existing Concrete Surface.
   b. Master Specification Section M01210, paragraph 3.01, Safeguards – Existing Equipment, Underground Utilities and Artifacts.

1.4 Addendum:

1. Draft Memorandum of Understanding and Request for Pub. 3000 Variance between the LBNL Advance Light Source Division, the Facilities Division, and the EH&S Division, dated March 28, 2005.

1.5 Responsibilities and controls:

Originators:

Michael C. Dong **Facilities Mechanical Section Chief, Facilities Division, Design & Construction Department**	**Date**
Dennis Nielsen **Technical Services Manager, Facilities Division, Plant Operation Department**	**Date**

Concurred by:

Jerry Ohearn **Department Head, Facilities Division, Design & Construction Department**	**Date**

Approved by:

Steve Black **Department Head, Facilities Division, Plant Operation Department**	**Date**

Glossary of Terms

Utility Coordinator: Person who is trained to use special designed instruments to find utility lines buried underground and responsible for completion of Penetration Permit in accordance with ADMN-053.

Non-destructive Means of Soil Removal: Soil removal by use of vacuum, or excavated with appropriate safe technology, such as an air knife, vacuum or hand digging (flat tipped shovel). Use of high pressure water excavator hand tools is specifically disallowed due to possibility of water leaks into underground high voltage electrical duct banks/conduits.

Destructive Means of Soil Removal: Soil removal by use of powered or heavy equipment.

Soil Excavation: Soil removal by use of non-destructive and /or destructive means.

Area Utility Sheets (U-sheets): Drawings that shows the existing underground utilities in an area of 1,000 feet wide in the East-West directions and 400 feet high in the North-South directions.

Exterior surfaces: 5’ or more from the building exterior wall surfaces.

Interior surfaces: All indoor surfaces including up to 5’ from the building exterior wall surfaces.

LBNL Property: LBNL property is defined to include all properties within the LBNL site and the leased buildings.

Locator: Special designed instruments used to find utility lines buried underground.

2.0 PERMIT PROCESS:

The following process defines the steps for penetration or excavation of any depth greater than 1-1/2 inches at LBNL.

STEP	RESPONSIBLE PERSON	ACTION
1	**Project Manager (PM)**	**STEP 1: PENETRATION PERMIT REQUEST WRC** The PM shall ensure that subcontractors are informed about LBNL Penetration Permit requirements so that they will allow for these costs in their bids. The requirement for the LBNL Penetration Permit and underground utilities location prior to excavation must be reviewed at Pre-bid meetings. The subcontractor is instructed to obtain the Penetration Permit from the Project Manager (PM).
	Subcontractor	1. The Subcontractor requests the PM to initiate the permit request. The request may be made any time after excavation is scheduled, but not so early that conditions may change prior to excavation. For efficiency of scheduling, the request should be made at least 10 working days before digging is scheduled to begin. The Subcontractor shall mark on the ground the extent of the excavation with **"WHITE"** color paint only (per Uniform Paint Color of California Government Code 4216, Underground Service Alert). **Note**: Once the Penetration Permit is issued, the subcontractor is responsible for all new underground utilities installed. As a result, additional Penetration Permit will not be required if the excavation is within the original boundaries of the initial Penetration Permit. If excavation extends beyond the original boundaries of the initial Penetration Permit, a new Penetration Permit with the new white painted boundaries shall be started.
	PM/Requestor	2. The PM or Requestor (for LBNL In-house Labor job) shall obtain a copy of the "Ground or Existing Surface Penetration Job Safety Analysis Checklist" (hereafter known as JSA Checklist) from the Utilities Coordinator Shop Supervisor. The PM shall provide the Job Safety Analysis Reference Checklist to the Subcontractor and/or his subcontractor.
	Subcontractor/ Requestor	3. The Subcontractor and/or his Subcontractor or Requestor (for LBNL In-house Labor job) shall complete the JSA Checklist and forward the completed checklist to the PM and the PM shall forward the checklist to the Utilities Coordinator Shop Supervisor. The JSA Checklist shall be completed prior to any penetrations.
	PM/ Superintendent/ Requestor	4. PM/Superintendent/Requestor shall request the Penetration Permit through the Work Request Center by completing the Permit Application form and fax it to the Work Request Center or use the Facilities web-page electronic version and paste into the online Work Request. For efficiency of scheduling, the request should be made at least 10 working days before digging is scheduled to begin. There is typically a 5 working day turnaround for the permit to be issued pending area access and locator sensing survey. For emergencies, there can be a 72 hour (workday) turnaround with Plant Operation Department Head approval. Poor planning does not constitute an emergency. 5. The PM/Superintendent/Requestor shall notify the closest Building Manager(s) of the upcoming construction activities.
2	**Utilities Shop Supervisor**	**STEP 2: WO TO UTILITIES COORDINATOR SHOP SUPERVISOR** 1. Utilities Coordinator Shop Supervisor gives Work Order and JSA Checklist to Facilities Utilities Coordinator if the exterior surface penetration is in the ground area and within LBNL site. For exterior concrete surface penetration, go to Step 2.2. For exterior surface penetration of LBNL leased building, the PM may proceed to authorize the Subcontractor to contact Underground Service Alert (USA) for underground utilities mark out. The Utilities Coordinator work scope consists of verification of the USA's underground utility mark out and issuance of the

PERMIT PROCESS *Continued*

STEP	RESPONSIBLE PERSON	ACTION
		Penetration Permit. Go to Steps 3 & 6. 2. For projects that require penetration through existing interior surfaces such as floors, walls and ceiling or exterior concrete surfaces in LBNL site and leased buildings, Utilities Coordinator Shop Supervisor shall initiate a task request to an outside Subcontractor who is qualified to determine the sub-surface utilities and structural components regarding specific location and depth prior to permit issuance. The task request shall include a completed JSA Checklist. The Utilities Coordinator Shop Supervisor will approve Subcontract Locators for work onsite at LBNL only if they have met all training and certification requirements. Under this procedure, Subcontractor firms performing work for LBNL retain responsibility for the health and safety of their personnel while on the job site. For interior surface penetration of the LBNL leased building, the Utilities Coordinator shall provide complete issuance of the Penetration Permit. Go to Steps 3 & 6.
3	**Utilities Coordinator**	**STEP 3: UTILITIES COORDINATOR PERMIT HOUR CLOCK** Utilities Coordinator Shop Supervisor starts the schedule for the permit at this time. Confirmation of receipt of the permit will be made to the requestor 24 hours after the receipt of the Work Order from Work Request Center. For efficiency of scheduling, the request should be made at least 10 working days before digging is scheduled to begin. There is typically a 5 working day turnaround for the permit to be issued pending area access and locator sensing survey. For emergencies, there can be a 72 hour (workday) turnaround with Plant Operation Department Head approval. Poor planning does not constitute an emergency.
4	**Utilities Coordinator**	**Step 4: Site Drawing Review** 1. Review available sub-surface utility maps (Area Utility Sheets (U-sheets)) for exterior underground infrastructure utilities and/or building underground utilities if the permit application is for interior surface penetrations. 2. Review drawings and other historical documentation which are available in B90F, Project Stick Files, and microfiche system. 3. Collect information from knowledgeable employees based on personal recollection of construction in a particular area. 4. Locate, on prints/maps, all underground utilities in work area. 5. Make copies of all relevant drawings. 6. Mark area defined by work requested on drawings to be included with permit. 7. Review any unexpected problems with PM/Superintendent/Requester.
5	**Utilities Coordinator**	**STEP 5: SITE LOCATOR SENSING SURVEY** 1. Thoroughly sweep work area with applicable Locator(s). Look for signs of recent excavations, patched asphalt, etc. particularly around nearby mechanical and electrical equipment pads or substations. Any new unrecorded utilities in these areas may extend into the permit area. Disconnected electrical circuits may need to be turned on to provide a flow signal where they could be crossing the permit area but not be detectable due to lack of current flow. Do not assume anything, if in doubt, get assistance from the appropriate building trades' supervisor and together clear the discrepancies. 2. Compare the location and depth of underground utility lines found using Locator with the location and depth shown on prints/maps. 3. Clear up all discrepancies between Locator findings and locations shown on prints/maps. 4. Mark the center line of buried utilities above ground using Uniform Color Code and marking standard consistent with California Government Code, 4216. Extend marks beyond area to be excavated so they will be visible throughout work. 5. Clearly indicate utility lines and shut-off valves on prints/maps. 6. All electrical wiring is to be considered energized until de-energized and Locked

PERMIT PROCESS *Continued*

STEP	RESPONSIBLE PERSON	ACTION
		out/Tagged out by a qualified electrical worker. 7. Mark area defined by work requested on surface to indicate extent of excavation. 8. Review any unexpected problems with PM/Superintendent/Requestor.
6	**Utilities Coordinator**	**STEP 6: PERMIT PREPARATION** Utilities Coordinator completes the permit, including: 1. Fill out the Penetration Permit. 2. Prepare notification list of persons/agencies to be notified before digging begins (if necessary). 3. Review available utility maps. 4. Locate utilities in the field. 5. Mark area defined by permit on maps to be included with permit. 6. Define requirements during initial survey of specific area with details for concrete excavation and any other special conditions to be met on the Penetration Permit. 7. Review any unexpected problems with PM/Representative/Requestor. 8. Complete the Permit Checklist. 9. Notify PM/Representative/Requestor that Permit is ready. 10. Give Penetration Permit, marked-up copy of prints/maps, and, if necessary, special conditions sheet and notification list to PM/Superintendent/Requester.
7	**PM/Superintendent/Requestor** **Utilities Coordinator** **PM, Utilities Coordinator** **PM, Subcontractor**	**STEP 7: SITE MEETING W/SIGNATURES** 1. Read and become familiar with this procedure. 2. Read and thoroughly understand Penetration Permit, marked-up copy of prints/maps, JSA Checklist, hold points and, if included, special conditions sheet, and notification list from Facilities Utilities Coordinator. Read and thoroughly understand all documents. 3. Discuss job with Facilities Utilities Coordinator, and clarify all uncertainties. 4. The PM/Requestor sets up a Pre-Dig Job Site Meeting at surface penetration site to issue the permit. The Pre-Dig Job Site Meeting shall include the Utilities Coordinator, PM/Requestor, excavation Subcontractor (person responsible for work); the General Contractor's Superintendent, LBNL Construction Safety Engineer and Inspector for the project. 5. The Utilities Coordinator reviews the permit, discussing details and answering any questions. All verbal directions issued during the site meeting, other than those in the permit, must be recorded in the permit. 6. The Utilities Coordinator and PM/Requestor sign the permit, completing LBNL approval. 7. The PM issues the permit to the Subcontractors, and obtains the Subcontractor's and sub-Subcontractor's signature accepting the terms of the permit.
8	**Utilities Coordinator**	**STEP 8: POSTING OF PERMIT** 1. The Utilities Coordinator notifies the PM/Requestor of the date that the permit will be posted; typically the same as the Job Site Meeting or job start date. 2. The Utilities Coordinator copies the permit, retaining the original in the Utilities Coordination Office, and provides a copy of the approved and official permit to the PM/Requestor and Inspection Section of the Design & Construction Department. 3. The Utilities Coordinator posts or arranges for posting the permit at the job site prior to the start of excavation.
9	**Inspector, PM/**	**STEP 9: PM/SUPERINTENDENT/INSPECTOR/REQUESTOR COMPLIANCE** 1. Read and thoroughly understand Penetration Permit, marked-up copy of

PERMIT PROCESS *Continued*

STEP	RESPONSIBLE PERSON	ACTION
	Superintendent	prints/maps, JSA Checklist, hold points and, if included, special conditions sheet, notification list from Facilities O&M Utilities Coordinator. Read and thoroughly understand all documents. 2. The LBNL Inspector and LBNL PM/Superintendent/Requestor shall confirm permit compliance with signatures, dates, and times. The LBNL Inspector and PM/Superintendent/Requestor will verify that the approved Penetration Permit is posted conspicuously at the excavation site, readily available to the person doing the digging, and will inspect the excavation site as necessary to verify Permit conditions are met and safe practices are followed, stopping work and resolving problems as necessary with Utilities Coordinator, and Subcontractor.
10	**Utilities Coordinator, Inspectors, PM/Superintendent/Requestor** **Subcontractor or In-house Craft Shops**	**STEP 10: HOLD POINT ADMINISTRATION** 1. Hold points identified on the permit will typically be administered as follows, although the LBNL representative who initiates the hold may specify release as appropriate to the circumstances: a. Utilities Lockout/Tagout, authorization to proceed: Utilities Coordinator or M&O Maintenance or LBNL leased building manager/project superintendent. b. Exposed utilities inspected, authorization to proceed: Utilities Coordinator or LBNL leased building manager/project superintendent. c. Inspection of excavation prior to backfill, utility's three-dimension coordinates recorded by LBNL Subcontracted Surveyor, authorization to proceed: Inspector. For LBNL leased building, Inspector shall confirm as-built conditions are marked on the Subcontractor's set of as-built drawings. d. Resolution of unusual conditions encountered, authorization to proceed: PM or as designated by PM. Resolution will be coordinated by the Utilities Coordinator, or PM/Superintendent/ Requestor, Inspectors or LBNL leased building manager/project superintendent. M&O craft supervisors (e.g. electricians or plumbers) and/or D&C Department A&E Chief Engineers (Mechanical, Electrical or Civil/Structural) will be contacted as appropriate. e. Resolution of encountered artifacts is with the LBNL archeologist as necessary. Authorization to proceed: PM. PM shall contact Facilities Planning: Environmental Regulations Specialist to contact LBNL Archeologist. 2. **IF** utility line(s) are found and identified, notify Facilities O&M Utilities Coordinator immediately. Place **HOLD** on job until LBNL Surveyor determines and records the actual alignment and depth of the located utility line(s). For LBNL leased buildings, the LBNL leased building manager/project superintendent shall confirm that the information is recorded on the Subcontractor's set as-built drawings. 3. PM/Superintendent/Requester shall contact LBNL subcontracted Surveyor to record the actual alignment and depth of the located utilities. Not required for LBNL leased buildings. Authorization to release: PM or Inspector. 4. At completion of work, place **HOLD** on job until LBNL subcontracted Surveyor determines and records the actual alignment and depth of the utility line(s). HOLD will be released after the requirements are met. Not required for LBNL leased buildings. Authorization to release: PM or Inspector. The PM or Inspector may release the HOLD if the following alternative work is performed by the Subcontractor. Alternatively, Subcontractor shall install reference points consisting of nail and hub/flagging at all changes in grade or alignment of the new pipeline and for all other utilities exposed by the excavation. The Subcontractor shall keep a separate written record referenced to each point with the following information:

PERMIT PROCESS *Continued*

STEP	RESPONSIBLE PERSON	ACTION
		(1) Offset and depth to top and centerline of utility, accurate to 0.1 feet (2) Type of utility (i.e. gas, water, etc.) (3) Size of utility (i.e. 2", 4", 16" wide duct, etc.) (4) Type of material of utility (i.e. cast iron, PVC, etc.).
11	**Subcontractor or In-house Labor Shop**	**STEP 11: PENETRATION WORK BEGINS** **HAND DIG ONLY:** 1. Depth of utility is known: Excavation within 30 inches radius of the marked utility must be excavated by hand using flat tipped shovel, vacuum, or excavated with appropriate safe technology, such as an air knife until the utility is located or the excavation has reached the required depth. Picks should be used with caution under these circumstances. High pressure water excavator is specifically prohibited due to the possibility of water leaking into high voltage underground power lines. 2. Depth of utility is unknown: If the depth of the utility is unknown at both ends of the job area which has been defined by the Requestor or Subcontractor, potholing must be performed using non-destructive vacuum, or excavation must be done with appropriate safe technology, such as an air knife, hand digging (flat tipped shovel), or compressed air tool such as bushing hammer with a spade bit (high pressure water excavator shall not be used) until excavation is exposed at the two ends of the utility and at every change of direction of the utility. When depth is verified, the PM may authorize destructive means to within a 30 inch radius around the utility. When 30 inch radius has been reached, non-destructive means must be used to expose the utility. **NOTE**: Where possible, shut-off and / or secure located utilities by Lockout/Tagout (LOTO) procedures before the excavation by destructive process is to start (per the Health & Safety Manual, Pub-3000, Chapter 18). All LOTO procedures shall be performed by LBNL Plant Maintenance Technicians (PMT)/Electrical Shop Electricians and coordinated by the Utilities Coordinator. For LBNL leased buildings, LOTO shall be performed by the LBNL leased building manager/project superintendent. 3. If it is necessary to hand dig 5 feet or deeper, follow the procedures outlined under OSHA and LBNL PUB-3000 Chapter 4, Section 10. 4. Watch for utility lines and indication of utility lines (sand backfill and warning identification tape) while carefully digging.
12	**Subcontractor, PM, Utilities Coordinator** **PM, Utilities Coordinator, Utilities Coordinator Shop Supervisor**	**STEP 12: PERMIT/PROGRESS VALIDATION** 1. All verbal conversations that allow modifications to the Penetration Permit shall be written on the permit. The specific details of the task and area shall then be authorized by signature (with date and time) of responsible parties involved. ANY and all change requests to a Penetration Permit, or extension of an existing permit, to be documented on the Penetration Permit, must receive the same level of review as in the original Penetration Permit process. 2. The Inspector evaluates whether the conditions of the Penetration Permit have changed such that continued work cannot be performed according to the original permit, and requires that a new permit to be issued. A new permit will require a total review of utilities drawings and locator survey if excavation area exceeds the original area approved and as indicated on the original Penetration Permit. The Utilities Coordinator issues a new permit if one is required by the Inspector. Otherwise, the Utilities Coordinator adds the extension dates on the permit original, and obtains the signatures required for the permit extension approval. Only a one-time consecutive 7 day extension is allowed. The Utilities Coordinator updates the permit and posts it at the job site.

PERMIT PROCESS *Continued*

STEP	RESPONSIBLE PERSON	ACTION
		3. The Subcontractor is responsible to ensure that a valid permit is obtained for the work being performed.
13	**Subcontractor** **Inspector, PM/ Superintendent**	**STEP 13: SUB-SURFACE WORK COMPLETE** 1. Pothole: **HOLD per Step 10.** HOLD shall be for a minimum of two hours. After two hours, the PM or Inspector may release the HOLD if the PM or Inspector verified that it is in compliance with Step 10. After each pothole, backfill with sand and mark results on the ground surface near the pothole with spray paint. Backfill immediately to prevent tripping or falling into hole. 2. Subsurface excavation: Three days before backfilling, the Project Manager shall be notified so that the LBNL subcontracted Surveyor can obtain the three-dimensional coordinates of all buried utilities. Buried utilities including the pipeline and any other utilities exposed during construction shall not be covered with backfill without the prior approval of the LBNL Inspectors. Coordination of this survey requirement is the responsibility of the Subcontractor. LBNL subcontracted Surveyor will be provided by the University when scheduled. The cost for delay or dig-up related to the Subcontractor's failure to schedule the utility survey shall be paid by the Subcontractor. At completion of all subsurface excavation / penetration work, place **HOLD** on job until LBNL subcontracted Surveyor determines and records the three-dimensional coordinates of the utility line(s) per Step 10. Survey is not required for LBNL leased buildings. 3. Inspector will notify PM/Superintendent to contact LBNL subcontracted Surveyor for the utility survey. Not required for LBNL leased buildings.
14	**LBNL subcontracted Surveyor** **PM/ Superintendent**	**STEP 14: RECORD(S) UPDATED W/AS-BUILTS** **HOLD per Step 10.** 1. LBNL subcontracted Surveyor determines and records the three-dimensional coordinates of the utility line(s). Not required for LBNL leased buildings. The LBNL leased building manager/project superintendent shall ensure that the Subcontractor's set of as-builds are updated to include the utility routing. Not required for LBNL leased buildings. 2. PM/Superintendent shall notify the LBNL subcontracted Surveyor to forward the recorded field information in AutoCAD format to the Utilities Engineer for the as-built of the Area Utilities Drawings (U-Sheets). Not required for LBNL leased buildings.
15	**Subcontractor or In-house Craft Shops**	**STEP 15: SUB-SURFACE UTILITY MARKING INSTALLED** **HOLD per Step 10.** Before backfilling for buried utilities over identification tape, the Inspector will verify that identification tape and tracer wire have been installed. Buried non-metallic utilities (electrical, mechanical, and civil) shall receive a tracer wire. 1. The tracer wire shall be installed on top of the buried utility crown. 2. The tracer wire shall be positively attached to the non-metallic buried utilities by plastic wire ties of similar type of attachment every 6 feet for straight run of utility and at all changes of direction. Tape shall be Polyken "930-35," Protecto-Wrap "310", or equal. 3. The ends of the tracer wire shall be exposed above the finished grade. 4. Install pre-cast concrete boxes at all locations where the ends of the tracer wire are exposed above the finished grade. The pre-cast concrete boxes shall not be more than 200 feet apart and shall contain a 24" coil of wire from each end of the tracer wire.

PERMIT PROCESS *Continued*

STEP	RESPONSIBLE PERSON	ACTION
		5. Tracer wire shall be continuous between boxes and shall be tested for continuity in the presence of Berkeley Lab's inspector. 6. Tracer wire shall be No. 10 AWG, copper wire with TW insulation. 7. Tracer wire shall be exposed above finished grade in the pre-cast concrete boxes at the transition where the non-metallic buried utility connects to the existing metallic utility. 8. Extend wire into valve boxes and terminate with a wire connector. Terminate wire from lines extending from mains to fire risers or building services 12" (300mm) above grade and cap with a wire connector. 9. Identification tape shall be installed 12" above the buried utility crown. The identification tape shall be continuous for the entire length of utility.
16	**Inspector**	**STEP 16: INSPECTION COMPLETE** At completion of work, HOLD will be released after inspection is completed, and the following determination made: 1. No defects found. 2. Minor repair required. 3. Major repair required. 4. Replacement required.
17	**Subcontractor or In-house Labor Shop**	**STEP 17: SUB-SURFACE WORK BURIED** All LBNL subsurface excavation backfill shall be per Contract Documents or LBNL standard drawing # 4BSTP039 for In-house work.
18	**Inspector** **Utilities Coordinator**	**STEP 18: PERMIT REMOVED AND CLOSED** 1. The Inspector will confirm with the Subcontractor that excavation is complete, including backfill, and remove the permit. 2. The Utilities Coordinator will set the electronic permit version to inactive (not current).
19	**Mechanical and Electrical Section Designer and Mechanical Section Chiefs**	**STEP 19: U-SHEETS UPDATE NOTIFICATION** The Mechanical and Electrical Section Designer will incorporate the as-build conditions to the U-sheets with the survey information from the LBNL subcontracted Surveyor. The Mechanical Section Chief will notify the Utility Coordinator Shop Supervisor that the U-sheets had been updated electronically and is ready for use. Not required for LBNL leased buildings.

3.0 PERMIT CHECKLIST:

Items	Checklists	Yes	No	Comment
1.	Has a Job Safety Analysis (JSA) Reference Checklist been completed?			
2.	Is Archaeologists Report (where necessary) required?			
3.	Is Wildlife Biologists Report (where necessary) required?			
4.	Is a Soil Engineering Excavation Evaluation (SEEE) (where applicable) required?			
5.	Have utility location maps, sketches, photos, etc included?			
6.	Has a soil penetration field survey been performed with applicable electronic locator?			
7.	Have As-Built building drawings or Area Utility Sheets (U-sheets) been reviewed?			
8.	Have historical construction project drawings and documents been reviewed?			
9.	Has information from knowledgeable employees based on personal recollection of construction in a particular area been collected?			
10.	Has a site map with enlarged project section showing the extent of the excavation been included?			
11.	Pre-start and Completed Project Notification List (Contact Names & Tel. #s).			
12.	Has a Hazard Assessment been completed?			
13.	Has LBNL Inspection Section of the Facilities Design & Construction Department been notified of permit issuance?			
14.	Has a copy of the approval permit been transmitted to the LBNL Inspection Section of the Facilities Design & Construction Department?			
15.	Utility Outages (where required) for: a. Voltage (High and/or Low) b. Compressed Air c. Water (Domestic, Industrial, Low Conductivity, and Treated) d. Natural Gas (High and/or Low pressure) e. Etc.			
16.	Has the Permit to Penetrate Ground or Existing Surfaces of LBNL Property been approved?			
17.	Has the PM notified the Building Manager, or Building Manager(s) closest to where there will be construction activities?			

4.0 GROUND OR EXISTING SURFACES PENETRATION JOB SAFETY ANALYSIS (JSA) CHECKLIST

This checklist is a reference only. Any additional requirements that the PM or Requestor deems necessary to assure safe-working conditions must take place. Federal OSHA requires that a qualified person perform a safety review of work and that a competent person supervise the work.

Prepared By: _____ **Date Prepared:** _____ **Permit #:** **WO:** _____

Signature: _____

		YES	NO	COMMENTS
1.	Have employees been trained in safe work practices and hazard recognition associated with working in and around excavation?			
2.	Have employees been familiarized with the appropriate excavation emergency procedures?			
3.	Does your excavator/laborer know about and is he/she following the 30″ buffer rule?			
4.	Is an observer present at all times during excavation?			

SURFACE ENCUMBRANCES (TREES, BOULDERS, HEAVY EQUIPMENT)

5.	Have all surface encumbrances, which may potentially pose a threat to employees working in or around the excavation, been removed or supported?			

UNDERGROUND INSTALLATION (SEWER, TELEPHONE, FUEL, ELECTRIC, WATER LINES, ETC.)

6.	Were the estimated location(s) of underground utility installations denoted prior to the opening of the excavation?			
7.	If on program facility, were program representatives contacted to assist in the location of any underground utilities prior to the opening of the excavations?			
8.	Have exposed underground utilities been adequately guarded or supported to protect employees?			
9.	Has an Outage request been submitted?			
10.	If an outage has not been requested, why?			
11.	If work will impact the Drainage Retention Basin or the berm around the Basin, contact PM.			

ACCESS AND EGRESS

12.	At a minimum, are all trench excavations of 4 feet deep or greater equipped with a stairway, ladder, or ramp every 25 feet of lateral travel?			
13.	Has a competent person designed all ramps/runways utilized for access and or egress for both personnel and equipment?			
14.	Have all steep-walled holes or trenches greater than 2 feet in depth been covered for the night or been provided with a ramp for sensitive species egress.			
15.	Have all ramps and/or runways constructed of two or more structural members been joined to prevent displacement?			
16.	Are all structural members utilized in construction of ramps and runways of uniform thickness?			

GROUND OR EXISTING SURFACES PENETRATION JOB SAFETY ANALYSIS CHECKLIST *Continued*

		YES	NO	COMMENTS
17.	Are all cleats and or other appropriate devices serving to connect runway structural members attached to the bottom of the runway to prevent trips or falls?			
18.	Are all structural ramps and runways constructed in a slip-resistant manner?			

EXPOSURE TO VEHICULAR TRAFFIC

19.	Are all employees associated with excavation activities and who may be exposed to vehicular traffic wearing appropriate high-visibility clothing?			
20.	Vehicle traffic (e.g., buses, trucks, autos) may also cause vibrations and trench/excavation wall loading: are safeguards in place, was traffic re-routed?			
21.	Is LBNL vehicle traffic warned of potential hazard with: road barriers, steel plates and operational flashing warning light?			

EXPOSURE TO FALLING LOADS

22.	Are employees working a safe distance from suspended loads handled by lifting and/or digging equipment?			
23.	Are employees maintaining a safe distance from vehicles, which are loading and unloading?			
24.	If occupied during loading and unloading, are haulage truck cabs equipped with a cap shield or canopy adequate to protect the operator from falling materials?			

WARNING SYSTEM FOR MOBILE EQUIPMENT

25.	Does the mobile equipment operator have a clear view of the edge of the excavation?			
26.	If not, are adequate hand signals, mechanical signals, and/or barricades in place?			

HAZARDOUS ATMOSPHERES, TESTING & CONTROLS

27.	Have all excavations in which potentially oxygen deficient, toxic or explosive atmospheres may exist, had adequate air monitoring performed?			
28.	Have adequate precautions been taken to prevent potential employee exposure to oxygen deficient, toxic or explosive atmospheres (i.e., ventilation/PPE)? Please, describe.			
29.	Is air monitoring conducted with sufficient frequency to ensure that work atmospheres remain safe? Please, describe.			

EMERGENCY RESCUE EQUIPMENT

30.	In excavation where hazardous atmospheres may exist or develop, is emergency rescue equipment including, but not limited to SCBAs, safety harness, and lifeline or basket stretcher available?			
31.	Are employees working in bell-bottom pier holes or similar deep and confined footing excavations wearing a safety harness and lifeline with a dedicated spotter in attendance?			

GROUND OR EXISTING SURFACES PENETRATION JOB SAFETY ANALYSIS CHECKLIST *Continued*

		YES	NO	COMMENTS
PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION				
32.	Are personnel prohibited from working in excavations where standing water is present?			
33.	Have adequate precautionary measure been implemented in excavations where standing water is present and in which personnel are required to work (e.g., trench, excavation shields, pumps, and/or safety harnesses and lifelines)? Please circle those that apply.			
34.	If water removal equipment is utilized to control the standing water in a trench excavation, does a competent person monitor this equipment to ensure correct operation?			
35.	If an excavation disturbs natural surface drainage, have ditches, dikes and/or sandbags been utilized to divert this drainage from entering the excavation?			
36.	Are excavations which have been subject to runoff from heavy rains or freeze thaw conditions been re-inspected by a competent person?			
STABILITY OF ADJACENT STRUCTURES				
37.	Are excavations which may undermine sidewalks or pavements prohibited?			
38.	Are excavation adequately protected via the installation of shoring or bracing where the stability of adjacent structures is endangered? Engineering Survey is required.			
39.	Are all excavations below the level of foundations or retaining walls prohibited?			
40.	If excavations are dug below the level of foundations or retaining walls, do they meet the following criteria? a. Is the excavation adequately supported (i.e., underpinning)? b. Is the excavation in stable rock? c. Has a registered professional engineer determined that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity. d. Has a registered professional engineer determined that the excavation poses no hazard to employees?			
PROTECTION OF EMPLOYEES FROM LOOSE ROCK OR SOIL				
41.	Are all loose material, soil and equipment prevented from falling or rolling into the excavation by removing this material to a minimum of 2 feet from the edge of the excavation?			
INSPECTIONS				
42.	Are pre-work daily inspections of the excavation(s) performed and documented by the subcontractor superintendent and/or LBNL Construction Safety Engineer?			
43.	Are inspections of each excavation performed and documented on as-needed basis to check for evidence of the failure of protective systems, or the accumulation of hazardous atmosphere and other hazardous conditions?			

GROUND OR EXISTING SURFACES PENETRATION JOB SAFETY ANALYSIS CHECKLIST *Continued*

		YES	NO	COMMENTS
44.	Are inspections of each excavation performed and documented after every rainstorm or other occurrence, which may increase hazards?			
45.	Have adequate precautionary measures been implemented to protect workers where there is evidence of a potential hazard posed to employees working in and around an excavation.			
FALL PROTECTION				
46.	Are the walkways or bridges equipped with standard guardrails where employees or equipment are required or permitted to cross over excavation?			
47.	Are remotely located excavations adequately barricaded or covered?			
EXISTING CONTAMINATION EVALUATION				
48.	Has an EH&S evaluated the project site for possible contamination?			
PERSONAL PROTECTIVE EQUIPMENT				
49.	Are the gloves and boots insulated and rated a minimum of Class 2 17kV with moisture absorbing liners and protective leather outers?			
CONCRETE PENETRATION				
50.	Have employees been trained in safe work practices and hazard recognition associated with concrete penetrations?			
51.	Have employees been familiarized with the appropriate emergency procedures?			
52.	Has proper coordination with Facilities personnel and other trades been met?			
53.	Has the location of embedded utilities been found? If yes, have LOTO procedures been followed for de-energization?			
54.	Are personnel performing penetration using proper personal protective equipment? The right safety gloves, safety shoes, safety glasses, ground fault interruption, & respirators?			
55.	Have all other methods the PM or requestor deems necessary to assure safe working conditions been met?			
56.	Has the nearest first aid kit, eyewash and telephone been located?			
57.	Does the working area require barricades? If yes, are they in place?			
58.	Have all special requirements for water dust control been met?			
59.	Is there adequate ventilation in the work area?			
60.	Is there adequate lighting in the work area?			

FACILITIES DIVISION

APPLICATION FOR PERMIT TO PENETRATE GROUND OR EXISTING SURFACES OF LBNL PROPERTY

THIS IS NOT A PERMIT ***DATE:*** _____

This is an ***application*** for a permit. After the proposed scope of work and the site have been reviewed, and the proposal found acceptable by the Facilities Division, Utility Coordinator, a permit ***may*** be issued.

Instructions

1. This application must be completed by the LBNL Project Manager (PM), LBNL Superintendent, or LBNL Requester.
2. Fax or email to Work Request Center, wrc@lbl.gov.
3. The WRC will send confirmation and job number. You will be contacted by the Utility Coordinator Shop Supervisor within 24 hours.

LBNL contact responsible for job/project: _____ (NAME) _____ (PHONE)

Title: _____ Cell Phone No: _____ Mail Stop: _____

Work to be performed by:

_____ (GROUP OR CONTRACTING AGENCY) _____ (RESPONSIBLE PERSON/CONTACT) _____ (PHONE)

Project Number _____ Account Number _____

Anticipated Start Date: _____ Anticipated Completion Date: _____

Description of Scope of Work: **Closest Building** _____

Penetration or excavation work is to be performed only inside the permit area as marked and defined below by building numbers, room numbers, and attached maps as necessary.

_____

_____

_____

Road/Deck/Surface Work: Type of Surface (Check all that apply)

Asphalt_____ Concrete_____ Landscape Surface_____

Total Length_____ Total Width_____ Depth (Max)_____

Structural Work: (Check all that apply)

Wall_____ Floor_____ Deck_____ Walkway_____

Core Drilling/Saw Cutting:

Area Size: W_____ L_____ Depth:_____ Diameter:_____

Anchoring:

Diameter:_____ Length:_____ Amount/Total number holes:_____

BERKELEY LAB	FACILITIES DIVISION ***PERMIT TO PENETRATE GROUND OR EXISTING SURFACES OF LBNL PROPERTY***	EMERGENCY NUMBERS LBNL On-Site Fire & Medical 7-911 LBNL Off-Site Fire & Medical 9-911 Campus Fire & Medical 9-911 LBNL Security 486-5472 Facilities Utilities 24-hr 486-5481

Instructions

This permit must be completed by the LBNL Utilities Coordinator, approval signatures obtained, and the permit posted at the job site before work is started that will require penetration or excavation of any ground surface, concrete wall, column or slab depth greater than 1-1/2 in. at LBNL, including the use of stakes or poles.

Work

LBNL contact responsible for job/project: _____ (NAME) _____ (PHONE)

Work to be performed by:

_____ (GROUP OR CONTRACTING AGENCY) _____ (RESPONSIBLE PERSON/CONTACT) _____ (PHONE)

Project Number _____ Account: _____ Permit: _____

Description of work approved by this permit:

_____

_____

Area Description

Closest Building _____

Penetration or excavation work is to be performed only inside the permit area as marked and defined below by building numbers, room numbers, and attached maps as necessary.

_____

_____

_____

Utilities

The following utilities are mapped as located in the permit area:

Utilities with valves to secure

- ☐ City water
- ☐ Treated water
- ☐ Low conductivity water (LCW)
- ☐ Natural gas
- ☐ Compressed air

Utilities with no valves to secure

- ☐ Sanitary sewers
- ☐ Storm drains
- ☐ Other _____

Utilities with disconnects, switches or breaker to secure

- ☐ Electrical conduits/ductbanks
- ☐ Telephone conduits/ductbanks
- ☐ Fiber Optic conduits
- ☐ Other _____

Prints/maps are attached, indicating approximate location of utility lines and shutoff valves. Valves are to be operated by LBNL personnel only.

CAUTION: Location of existing utility lines shown on maps may not be accurate. Drawings are to be used for reference only. Prior to digging all utility lines shall be located by the LBNL Utilities Coordinator to the best of LBNL's ability, and confirmed in the field by hand digging of test holes by the group or contracting agency prior to start of work (see Cautions and Special Conditions section, Hold Points).

Specifications for the utilities checked above:

_____

_____

PERMIT *Continued*

BERKELEY LAB	FACILITIES DIVISION ***PERMIT TO PENETRATE GROUND OR EXISTING SURFACES OF LBNL PROPERTY***	_____ - _____ PERMIT NUMBER

Cautions and Special Conditions

HAND DIG ONLY:

1. Depth of utility is known:
   Surface excavation or drilling within 30 inches radius of the marked utility must be excavated by hand using flat tipped shovel, vacuum, or excavated with appropriate safe technology, such as an air knife, or high pressure water excavator until the utility is located or the excavation has reached the required depth. Picks should be used with caution under these circumstances.
2. Depth of utility is unknown:
   If the depth of the utility is unknown at both ends of the job area which has been defined by the Requestor or Subcontractor, pothole must be performed using non-destructive vacuum, or excavated with appropriate safe technology, such as an air knife, hand digging (flat tipped shovel), or high pressure water excavator means of excavation to exposed the two ends of the utility and at every change of directions to ascertain the location and depth of the utility. When depth is verified, the PM may authorize destructive means of soil removal to within a 30 inch radius around the utility. When 30 inch radius has been reached, non-destructive means of soil removal must be used to expose the utility.
   NOTE: Where possible, shut-off and / or secure located utilities by applying Lockout/Tagout (LOTO) procedures before the excavation by destructive means of soil removal. All LOTO procedures shall be performed by LBNL Plant Maintenance Technicians (PMT) and coordinated by the Utilities Coordinator.
3. If it is necessary to hand dig 5 feet or deeper, follow the procedures outlined under OSHA and LBNL PUB-3000 Chapter 4, Section 10.
4. Watch for utility lines and indication of utility lines (sand backfill and tape) while carefully digging.

Special conditions

In addition, the following special conditions must be observed, including environmental and safety concerns.

_____

_____

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_____

_____

Hold Points

No work is to proceed from one hold point to the next without authorization from the LBNL representative below.

☐ **Utilities secured as required above in Cautions and Special Conditions**.

LBNL REPRESENTATIVE

☐ **Utilities exposed by hand digging**.

LBNL REPRESENTATIVE

☒ **Prior to backfill**. Hold for inspection and recording of utility coordinates by LBNL subcontracted Surveyor:

LBNL REPRESENTATIVE

☐ **Unusual conditions encountered**. Hold for resolution and authorization to proceed:

LBNL REPRESENTATIVE

☐ **Bones or artifacts encountered**. Hold for PM's authorization to proceed:

LBNL REPRESENTATIVE

PERMIT *Continued*

BERKELEY LAB	FACILITIES DIVISION ***PERMIT TO PENETRATE GROUND OR EXISTING SURFACES OF LBNL PROPERTY***	_____ - _____ PERMIT NUMBER

Permit Approval and Duration

Subject to the above specified conditions, approval is granted for penetration/excavation of the area described above.

Permit is valid from: _____ to: _____

LBNL Facilities/Utilities Coordinator: _____ _____
SIGNATURE DATE

LBNL Facilities/Utilities Coordinator Shop Supervisor: _____ _____
SIGNATURE DATE

Acceptance of Terms of Permit:

I have read and understood the conditions of this Permit to Penetrate or Excavate Surface of LBNL Property per ADMN-053.

LBNL Project Manager/Superintendent/Requestor: _____ _____
SIGNATURE DATE

Subcontractor representative: _____ _____
SIGNATURE DATE

Permit Extension:

At expiration date a one-time consecutive seven day permit extension may be granted by the Utilities Coordinator. Beyond that, a new permit must be processed again.

7 day Extension:	**Signature**	**Date**
Subcontractor Representative:		
Utilities Coordinator:		
PM/Superintendent/Requestor:		
Utilities Coordinator Shop Supervisor:		

Permit Extension is valid from: _____ to: _____

PERMIT *Continued*

FACILITIES DIVISION

PERMIT TO PENETRATE GROUND OR EXISTING SURFACES OF LBNL PROPERTY

_____ - _____
PERMIT NUMBER

Compliance observation sign-off when site is visited by LBNL personnel

LBNL PM/Superintendent/ Requestor/Supervisor	TIME & DATE OF VISIT	COMPLIANCE YES OR NO	LBNL Inspector	TIME & DATE OF VISIT	COMPLIANCE YES OR NO

Off-shift or night-time phone numbers are 510/486-7941 and 510/486-5481.